IDEST Torque

Newsletter September 2025 **Volume 25, Number 3**

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Volume 25, Issue No 3

Welcome to the third IDEST Torque of 2025. Perhaps this edition should be subtitled valves special as we seem to have lots of articles on that subject. We also answer lots of very tricky questions from the field. Hopefully something for everyone, read on to find out.

Airgun cylinders revisited

Our article on PIAT of gas cylinders used for refilling air weapons was well received.

One centre expressed concern regarding 5-year test intervals as they are seeing many 'shooter' cylinders with internal corrosion. The suspicion is inadequate filtration, poor maintenance and limited operator knowledge on small, low-cost compressors is leading to excess moisture in fills.

The benefit of the UK's risk-based approach is that if you conclude that a cylinder may not remain in a safe condition until the next 'routine' test or inspection you can set a shorter interval.

The example they had at hand was a non-diving cylinder and valve and so the cylinder was eligible for 5-year test regimen. We advised in the circumstances described that they were quite at liberty to impose a shorter interval, including a visual at 2½ years (or even 1 year), and they should discuss their reasoning with the cylinder owner.

Danger of internal corrosion

In March 2025 HSE updated their advice note titled "*Diving cylinders – the danger of internal corrosion*" [link]


Health and Safety Executive

Diving cylinders – the danger of internal corrosion

This is a handy document to print off and display where visiting divers drop off their cylinders for filling. It talks clearly about rapid corrosion rates and gives good advice to divers on how to minimise risks. The final paragraph is unequivocal:

"*The potential consequences of this unseen corrosion can be serious. If you consider there is any chance of water having entered your cylinder have it internally inspected before it is filled*".

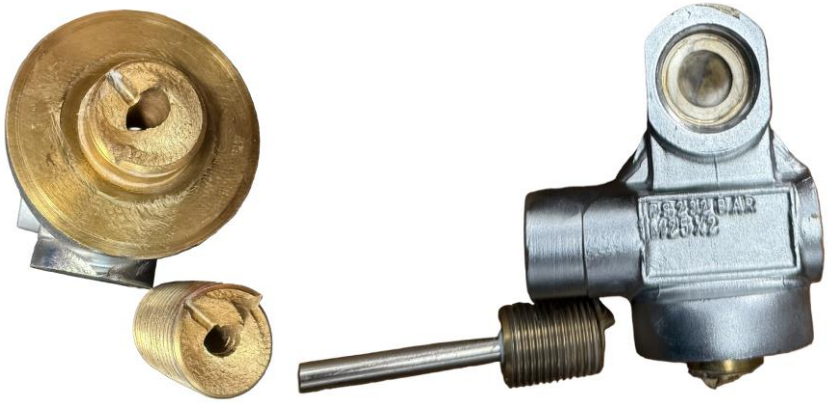
M25 to M18 valves

One of our centres reported receiving multiple cylinders for PIAT which turned out to be fitted with M25 valves that had been machined down to M18 thread.

The cylinders were well passed their periodic test interval, so this machining operation was carried out some years ago.

Used in a non-diving application, the owner reported having purchased the valves online.

The centre undertook some evaluation during which one of the valve threads failed at the safety pressure escape hole.



Modification of valves and threads in this way, without manufacturer authorisation and safety recertification of the valve, is potentially very risky. The centre acted correctly by informing the owner who agreed to the replacement of the valves with proper M18 alternatives.

Non serviceable 'airgun' valves

The shooting world gave us another curve ball. One of our centres received a surface use cylinder from a local shooter for PIAT. Not having drawings or parts for the valve they sensibly reached out to the importer/distributor for information.

The answer came back that the valve cannot be serviced as they can't supply the parts, however, the valve is good for 10 years without service.

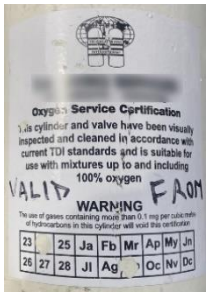
We were contacted for advice.

This is a very similar scenario to some commercial SCBA valves where they have a 10-year service life, and we accept that PI/PIAT includes only external cleaning and checks of the valve (threads etc) until the 10th anniversary when the valve is replaced with new.

BS EN ISO 22434:2022 5.2.3 and 5.2.4 allow for 'external examination' of a valve so in our opinion, and in accordance with the importer's guidance, it is fine to proceed on this basis.

The challenge will be determinising when the 10th anniversary has been reached as there was no discernible date on the valve. Working off the cylinder test stamping may be the only realistic option (i.e. change every second PIAT).

O2 sticker woes



There's quite a lot of variation in dates seen on O2 stickers. Some say valid from, some valid until, some just the date.

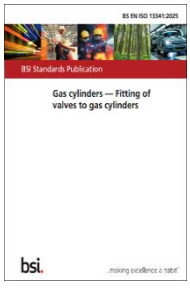
We are examining our own O2 clean label template to see how we can improve it. Ours says valid until, but we may change to valid from. Please let admin know your thoughts.

One query came up recently regarding how to punch a sticker with a valid until date where the 15-month window will extend beyond the next routine inspection. The answer was simple -

If an O2 clean is requested for 15 months and that is less than the time remaining before the next test, Hydro or visual, then the O2 clean period should end at the next test/inspection date. i.e. punch the sticker to coincide with the next test due date.

For example - A cylinder has a visual on June 1st 2023 and runs out in Dec 2025. If it comes in for an O2 clean in March 2025 then its O2 clean cert runs out in Dec 2025, not August 2026.

BS EN ISO 13341 update



BS EN ISO 13341:2025 Gas cylinders. Fitting of valves to gas cylinders has been released. It replaces BS EN ISO 13341:2010+A1:2015 which is now withdrawn.

The main changes are as follows:

- update of Clause 2 and Bibliography
- addition of a requirement in 5.3 with regards to the cleaning of cylinder threads.

Concerns and Complaints

Further to our last article on the IDEST complaint system, one complaint was closed since the last edition:

C-022 – A test centre closed and was sold to a third party. When a cylinder was brought in for filling at another IDEST centre they spotted that the IDEST stamp (8D) was still being used. We recommended the IDEST centre offer the cylinder owner a retest before filling the cylinder.

Further investigation showed the equipment including the stamp was sold in good faith due to the untimely death of the business owner. The seller was unaware of the significance or ownership of the stamp. The buyer was also unaware and felt it was part of the purchase package. However, they agreed to surrender the stamp to IDEST, and it was collected by an inspector 4 days after the complaint was recorded on our system. We remain open to the buyer joining the IDEST scheme if they choose to do so. A quick and satisfying result.

If you are thinking or closing, selling or transferring your Centre then please remember that the stamp remains the property of IDEST and must be returned. We are very happy to support sales and transfers and, in most cases, can assist a seamless transition so talk to us first.

C-019, C-020 – Reman open, under investigation.

Master gauge mounting

In the 'Toolbox talk' of the last edition we discussed some key requirements that apply to the master gauge.

We are grateful to Ken Scott at Moray Firth Dive Centre, IDEST Training Centre TC011, for reminding us that ideally analogue master gauges should also be isolated from the hydro pump.

If the master gauge is mounted on the same board as the pump it can get "vibrated" out of calibration. It depends on how hard the pump "bangs" but it is best to have it separate.

One of the challenges can be ensuring it remains at eye level for accuracy of reading as one of Ken's recent students found when they isolated their master gauge by introducing a 1000 bar rated flexible hose between the gauge and the manifold.

Borrowing a plastic rolling kick step stool from the adjacent office restored a perfect sightline for the technician while performing their monthly gauge comparison.

SCBA Composite cylinders

By and large there has been relatively low uptake of composite cylinders amongst divers. The buoyancy of the cylinders, limited choice, relative cost and other factors likely influence this.

Conversely there has been significant deployment of composite cylinders by non-diving safety and rescue organisations. Light weight, high working pressures, durability appeal in this sphere. We have some IDEST members whose businesses revolve solely around serving these industries and organisations, and they are specialists in this domain.

Every so often an IDEST 'dive' centre is approached to test for non-diving organisations. Most often the opportunity presented involves multiple composite cylinders and potential for regular repeat business, so it appears an attractive prospect. Such cylinders are in scope of the IDEST scheme so should you accept?

If the technician and/or centre are not composite certified, then clearly no. If the centre and technician are composite certified, then it depends on whether you are competent to undertake the work. Cylinders and valves used for SCBA can differ significantly from their SCUBA counterparts. Remember, a competent person possesses sufficient training, experience and knowledge appropriate to the nature of the work to be undertaken. They also have access to the necessary drawings, technical data and parts to support the work.

In a recent discussion we found the SCBA manufacturer published "*Additional instructions to EN-ISO 11623*" which contained some detailed and essential corollary to the main standard. For example, clamping the fully wrapped cylinder to remove the valve would have compromised the neck integrity and required destruction of the cylinder. Proper valve removal for the cylinder under discussion requires holding the cylinder by the metal neck using a U-spanner while removing the valve with a valve mounted tool. In addition, specialised parts must be replaced as part of the inspection, and several additional visual inspection acceptance criteria apply.

Valves can also differ. Some SCBA valves are not serviced, only inspected, and replaced at set intervals. Some require specialist tools, parts and techniques.

The world of SCBA appears less open than that of SCUBA. SCBA manufacturers frequently control access to tools, service documentation, parts etc. Many require specific training on servicing their products before authorising supply. Achieving competency in this domain is a significant undertaking but can be a valuable addition to your business.

[source] Interspiro - Additional instructions to EN-ISO 11623

DOT-3AL / CE cylinder update

Remember the DOT-3AL cylinder we mentioned in the January edition? Here is the ongoing story…

The cylinder neck stamping reads as follows:

COLTRI SUB CE0426 PS200BAR TS-20/+60C PT344BAR 14.2KG DIVING BREATHING GAS DOT-3AL 3000 BW0003141 M4002 02Ⓟ11 CATALINA S80 M25X2

Much of the marking will be instantly recognisable to technicians but for clarity we'll expand a few:

- DOT-3AL - The U.S. regulatory authority, the Department of Transportation (DOT), and manufacturing specification, 3AL.
- 3000 - The cylinder service pressure, in pounds per square inch (psi).
- BWXXXXXXX - The serial number of the cylinder. The prefix "BW" indicates it was manufactured by Catalina Cylinders in Garden Grove, CA. These cylinders are typically S80.2-BW type, tested at 5000 psi.
- M4002 - The M-number or Manufacturers Number issued by DOT.
- 02Ⓟ11 - The original hydrostatic test date of the cylinder, month followed by year, performed at the time of manufacture of the cylinder. The "Ⓟ" represents the symbol of the Independent Inspection Agency (IIA) performing the inspection
- CATALINA - The name of the manufacturer of the cylinder.
- S80 - The cylinder identifier. It identifies the market, "S" for SCUBA, and capacity, "80" for a capacity of 80cuft.
- M25X2 - The cylinder outlet thread designation

What captured our interest was the CE0426 stamp. This is a European notified body marking belonging to ITALCERT SRL [link].

Via the Coltri website we were able to locate "*Certificates of Compliance and Test Reports*" and "*Declarations of Conformity*" for cylinders with similar serial numbers. These affirm compliance with the Pressure Equipment Directive (PED) 97/23/EC (now replaced by 2014/68/EU).

So, it appears to us to be a case of dual marking, and this cylinder can be tested, filled and used within the UK.

'Home' O2 Cleaning

We were approached by a centre seeking clarification regarding the acceptance of cylinders placed into oxygen service ("O2 cleaned") by parties outside of the IDEST scheme.

This centre was especially concerned as they received some cylinders for PIAT, known to

have been 'cleaned' by an individual, which showed signs of internal corrosion. They suspected an ineffective drying process following the chemical wash and rinse.

Sadly, there are no standards or legislation in Europe regarding the cleaning of breathing gas cylinders that are to be used with a higher-than-normal Oxygen content. The European Industrial Gases Association, (EIGA) Doc 33/18 is the cornerstone of Cleaning of Equipment for Oxygen Service. And the importance of both oxygen compatibility and oxygen cleanliness are widely recognised. For more than a decade the UK diving industry has operated to a 15-month regimen for cleaning and inspection, and incident rates involving ignition within cylinders or valves are extremely low. Most fires starting in regulators or hoses.

HSE Leaflet INDG459, Oxygen use in the workplace, is very clear "*Employers are legally required to assess the risks in the workplace, and take all reasonably practicable precautions to ensure the safety of workers and members of the public*". It goes on to discuss safety aspects regarding equipment, procedures and maintenance surrounding safe use of oxygen in the workplace.

Ultimately it falls on the filler to be satisfied of the safety and suitability of the cylinder ahead of filling (ISO 24431).

Training in oxygen cleaning is available through some diving certification agencies, although most sensibly restrict to students employed by scuba related facilities, manufacturers or distributors.

But training alone is insufficient, the filler must consider whether the cleaning has been performed by a 'competent person'. i.e. someone who possesses sufficient training, experience and knowledge appropriate to placing a cylinder into oxygen service, and has access to the required tools, materials and documentation. How likely is it that a 'home' cleaner has access to calibrated thread gauges, torque wrenches, ISO standards, oxygen compatible parts etc.

In short, we recommend only accepting cylinders prepared for oxygen service by recognised entities such as IDEST members, VCA authorised bodies etc.

[sources] HSE, Oxygen use in the workplace, Fire and explosion hazards
EIGA Doc 33, Cleaning of Equipment for Oxygen Service

Servicing valves

IDESTs Code of Practice (CP11) states a number of requirements related to valve servicing. These include:

4.26 General equipment/tools & manufacturers' spares to enable the valve to be dis-assembled and re-assembled.
8.12 Cleaning of cylinder valve, rebuild and use of manufacturer's servicing kits.

The world is ever more complex, with more sources and variations of valves being encountered by technicians. Parts support for older valves waning, and sometimes different lifetime strategies such as replacement rather than service.

As inspectors we see a variety of working practices in the centres we visit. The gold standard is where the technician reaches into their parts inventory and pulls out a complete manufacturer's service kit matching the valve on the workbench. They get extra points if they have a system in place to record traceability of the kit between the point of supply, and it leaving their centre to the customer.

Some centres prefer to bulk purchase individual component parts from the valve manufacturer (and frequently elastomers from alternate sources). There are many downsides to the approach, including increased opportunity to fit incorrect parts, potential poor quality of elastomers, stock rotation etc. If you go down this road, make sure you are well organised – parts bins clearly labelled. Drawings annotated with o-ring sizes, purchasing documents from reputable sources and delivery notes showing batch numbers, shelf life etc.

Sometimes we are asked "*what if I can't get spares? Can I visually inspect and re-use existing parts?*".

BS EN ISO 22434:2022 section 3.4.3 defines refurbishment as "*operation involving dismantling of the valve, evaluation and re-use or replacement (if necessary) of its internal components, and reassembly to make it suitable for further service*"

So yes, you *can* evaluate and re-use internal components, but the question is whether you *should*? We had complaints from divers regarding failure of valves where it is clear internal parts have been re-used. Proceed with caution and always err on the side of safety. Valves of an age where support is limited are often better replaced with new.

In summary, our guidance for valve servicing is, in order of preference:

1. replace the valve with new at the manufacturer's recommended interval, or when it is too old to be properly maintained.
2. refurbish the valve with a full OEM service kit
3. refurbish the valve with OEM (bulk) parts
4. visually inspect non-elastomeric components (e.g. HP plug and seat etc), re-use or replace as required

In all cases elastomers and sealing parts (o-rings, copper washers etc) must be replaced with OEM parts (or identical high quality non-OEM equivalents). Use of non-OEM key parts (e.g. HP plugs and seat etc) is discouraged unless OEM endorsed, as we cannot be certain they meet the original manufacturer's design intent.

If you are going to put the old components into the polythene bag that the new parts came in, and return to the customer as proof of work undertaken, then we recommend cutting the elastomers.

Pressure mismatch case studies

A centre contacted us for guidance regarding 4 rebreather cylinders that had come in for PIAT.

The cylinder valves on this rebreather configuration employ a novel multiple outlet system with a flexible high pressure manifold linkage.

The challenge was that the CE EN144-1 M25x2 LOLA valves are marked as rated to 200 bar, and the 7-liter Eurocylinder Systems AG (ECS) cylinders are marked as working pressure 230 bar.

A clear pressure mismatch exists between the valve and the cylinder. The HSE's no nonsense approach is to adopt sound engineering practice. If the cylinders are pumped to 230 bar then that exceeds the typical 10% over pressure allowance of the valve (especially if you consider heat of compression). 230 bar valves are commonly available so the simplistic answer could have been to say reject the combination. However, alternative 230 rated valves that support this flexible high pressure manifold arrangement are not widely available so, adopting a pragmatic approach we gave the following guidance…

Complete the PIAT in full, remediating any issues found. Apply the red pressure mismatch quadrant label to each cylinder. Document in writing on both the worksheet and test certificate that **the maximum working pressure of the 'system' is 200 bar and this should not be exceeded**.

In another case, a centre was faced with a cylinder arriving for PIAT that is 250 bar working pressure (test pressure 375 Bar) and fitted with a 300 bar rated valve.

The risk of this cylinder accidentally being filled to 300 bar is high due to the valve outlet form. As 250 bar valves are not available, the guidance we gave in this case was to replace the valve with a 232 bar rated model. Best practice would again suggest the addition of a red pressure mismatch quadrant label; however, this is less critical in this scenario as the cylinder now exceeds the rating of the valve inlet. Should the cylinder be deliberately filled to 250 bar it remains within the typical 10% over pressure allowance of the valve.

Commercial use, regular inspection

The world of commercial diving gave us another workout. Again, a centre approached us for guidance where they had received 4 x 7Ltr cylinders. The date of the last hydro (PIAT) was 2024/09 and the cylinders were correctly labelled with a green quadrant to specify next test as visual (PI) on 2027/03.

The commercial customer requested a 6-month visual only, as they were shipping the cylinders to a remote location for a specific short-term contract.

The centre asked:

- Do I remove other labels, or not? (They are still valid).
- Do I have to service and re-build the valves? (This was done only a short while ago)

Our advice was… the cylinder should be visually inspected, with further investigation / remedial action for any issues observed. There is no need to dismantle or service the valve, but it should undergo a basic external assessment (e.g. smooth operation, clean condition etc), with further investigation / remedial action for any issues observed. The existing stamping and labelling should be left as-is. No additional labelling is required.

The cylinder should be returned to the customer with a document that records the inspection (e.g. certificate of visual inspection) which includes the identity of the cylinder/valve, type of inspection, any observations or actions, date etc.

The end user should use that certificate to update / maintain their HSE records in accordance with their own policies and procedures. If the customer insists on a label on the cylinder, then the IDEST Quadrant should not be used, the centre should create a simple label that shows their company name and address, the type of examination and date.

This differs from the scenario where, following risk assessment, you may wish to impose a shorter period before the next inspection (e.g. due to poor condition inside the cylinder due to lack of care or abuse). For that scenario you would date the quadrant sticker according to the perceived risk at less than the normal 2½ / 5 year regimen.

Valve serial numbers

Our final question from the field:

"*The worksheet has space for a valve serial number, but many old valves are unmarked, some have batch numbers, only a few have serial numbers. What is IDESTs guidance on completing this field on the form?*"

Our reply… we cannot magic up what is not there so the serial field on the worksheet should be filled in as "not marked" or similar.

We have seen several complaints where investigation has shown the valve has been replaced after service. This is only possible to prove because the centres have kept good records of their work. If the valve has no serial number or other identification, then a photograph of the valve after servicing is a valuable measure.

Serialising valves is becoming more common and IDEST is lobbying the valve Standards Committees to include valve serialisation in future editions of the standards, but we are not on those committees so have no direct influence.

Trojan pump video

Trojan pumps are very common amongst our members, so we thought we'd bring your attention to this excellent video on the Hydraulic Pneumatic Services Ltd (HPS) YouTube channel.

(click the image)

HPS description "*In this video we will show you what to expect when the silencers become blocked on a Trojan pump. Due to contamination from the air and surrounding atmosphere over time the silencers can become blocked which will slow down the operation of your pump. You can see in this video it is safe to remove the silencers to confirm that they are causing the issue.*"

Well worth a watch even if your Trojan pump is working perfectly.

[source] https://www.youtube.com/watch?v=Cl5fhVwMivk

Missing Torque?

Have you missed any edition of Torque? Don't worry, all of the past issues can be downloaded from the members section of the **IDEST website**. Take a look!

IDEST Test Centre Update

We have had the following changes to the IDEST Test Centre listing since the last issue of Torque.

New centres
None

Leaving centres
Aqualand Divers [2K], retired

Reinstated Centres
Malakoff Ltd (6T)

Temporarily suspended centres
Revolution Air Services [9J]
Wirral Sport and Leisure [2E]

Fully suspended centres
None

The use of blue or green quadrants or the IDEST stamp to validate a cylinder test or inspection at any suspended centre is not recognised. Temporary suspension indicates that active dialog is underway in the hope of resuming testing in due course.

A final thought…

We hope you've enjoyed reading this issue of Torque. Please let Alison have your feedback on this issue and suggestions for topics in upcoming editions. Thank you!